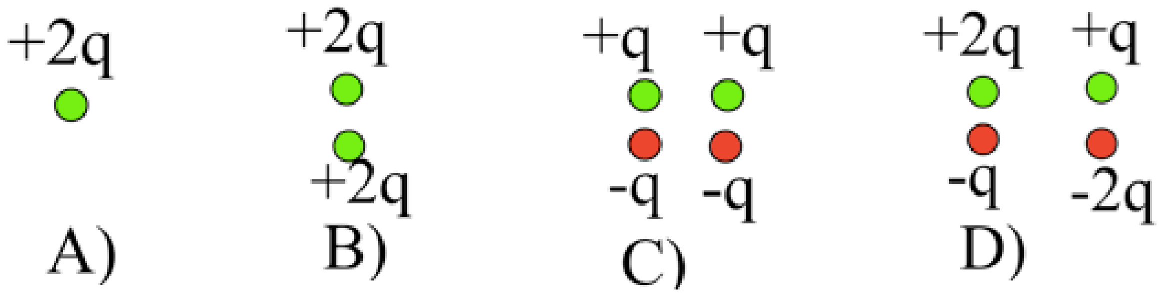
Which charge distributions below produce a "dipole like" potential when you are far away?



E) None of these, or more than one of these!

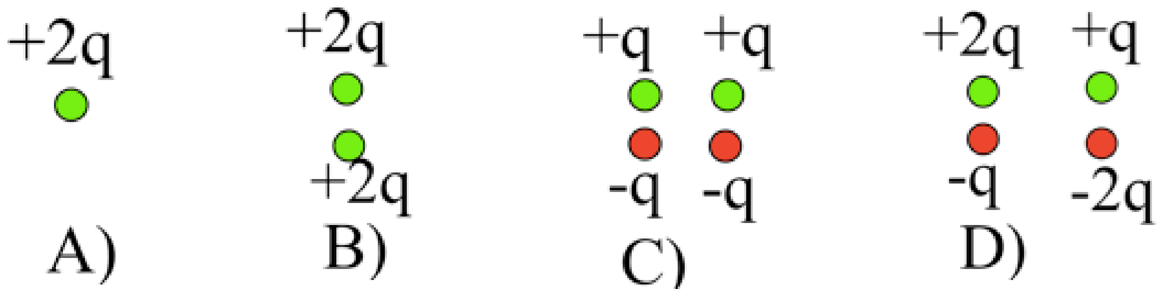
(For any which you did not select, how DO they behave at large r?)

PHY 905 SEC 005 UPDATE

SURVEY OF PHYSICS EDUCATION RESEARCH (3 CREDITS)

- Will count as capstone for Physics and Astronomy majors
- Will count as Tier-2 Writing Requirement
- Need override to be enrolled
- See Jenn Roberts to get enrolled in class
- Make appointment with Stuart Tessmer for class to count as capstone

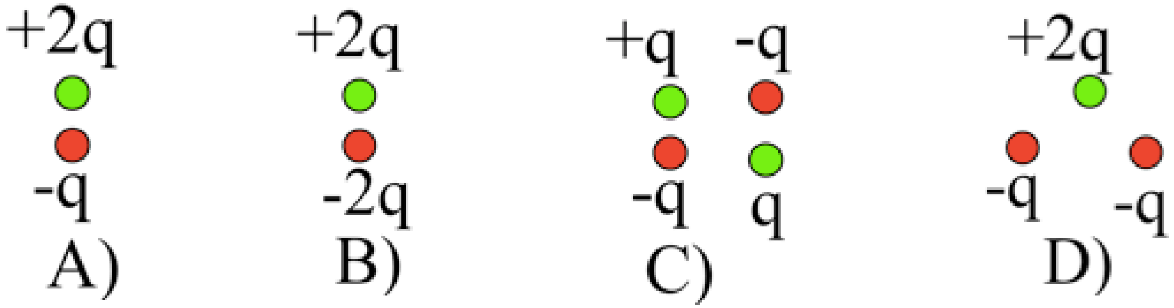
Which charge distributions below produce a potential that looks like $\frac{C}{r^2}$ when you are far away?



E) None of these, or more than one of these!

(For any which you did not select, how DO they behave at large r?)

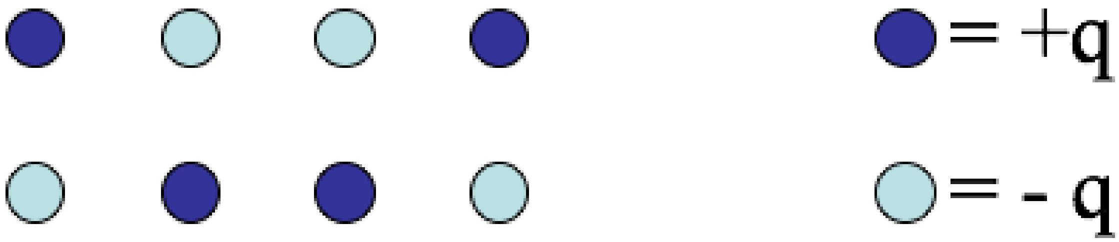
Which charge distributions below produce a potential that looks like $\frac{C}{r^2}$ when you are far away?



E) None of these, or more than one of these!

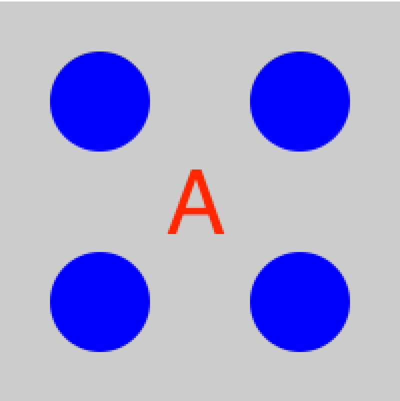
(For any which you did not select, how DO they behave at large r?)

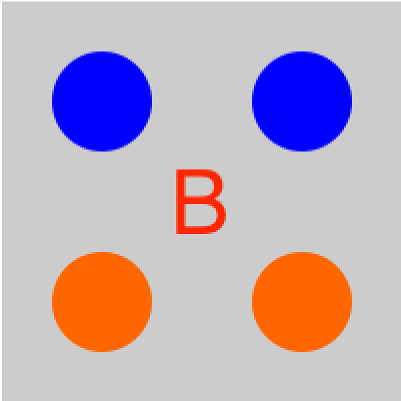
In terms of the multipole expansion $V(r) = V(mono) + V(dip) + V(quad) + \ldots$, the following charge distribution has the form:

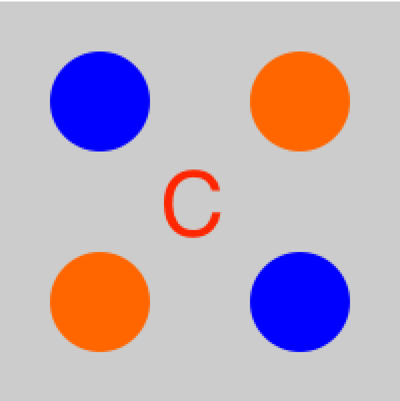


A. $V(r) = V(mono) + V(dip) +$ higher order terms
B. $V(r) = V(dip) +$ higher order terms
C. $V(r) = V(dip)$
D. $V(r) =$ only higher order terms than dipole
E. No higher terms, $V(r) = 0$ for this one.

Which of the following distributions could have a dipole contribution to the potential far from the charges?



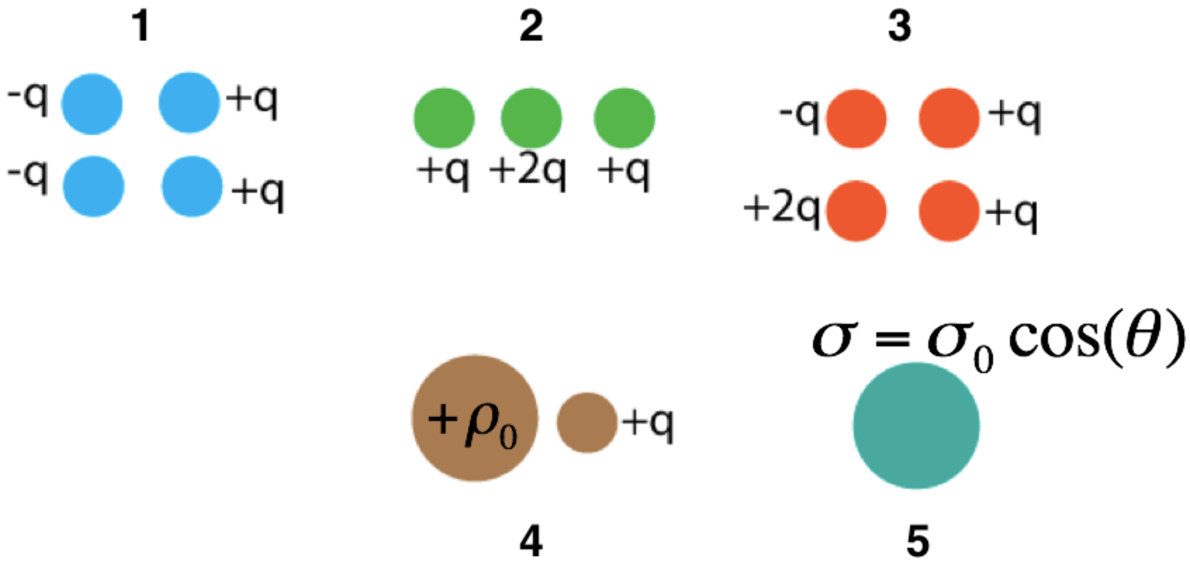




D. None

E. More than one!

In which situation is the dipole term the leading non-zero contribution to the potential?



A. 1 and 3

B. 2 and 4

C. only 5

D. 1 and 5

E. Some other combo

Consider a single point charge at the origin. It will have ONLY a monopole contribution to the potential at a location $\mathbf{r} = \langle x, y, z \rangle$.

As we have seen, if we move the charge to another location (e.g., $\mathbf{r}' = \langle 0, 0, d \rangle$), the distribution now has a dipole contribution to the potential at $\mathbf{r}$!

What the hell is going on here?

A. It's just how the math works out. Nothing has changed physically at $\mathbf{r}$.
B. There is something different about the field at $\mathbf{r}$ and the potential is showing us that.
C. I'm not sure how to resolve this problem.